Government Process Architecting Framework (GPAF)

Created by: Department of Administrative Reforms and Public Grievances (DAR&PG) May, 2012

This document, *Government Process Architecting Framework* (GPAF), prescribes a methodology for rationalizing the operational processes in a government organization.

Preface

The *Report on Business Process Re-engineering* published by the Department of Administrative Reforms (DAR&PG) in November 2010 was a concept paper based on 11th report of second Administrative Reforms Commission(ARC) that outlined the main purpose and principles of process reengineering in the Government.

- For every function a government department performs, there should be a step-by-step analysis of each process to ensure its rationality and simplicity.
- Such analysis should incorporate the viewpoints of all stakeholders, while maintaining the citizen-centricity of the exercise.
- After identifying steps which are redundant or which require simplification, and which are adaptable to e-Governance, the provisions of the law, rules, regulations, instructions, codes, manuals etc. which form their basis should also be identified.
- Following this exercise, governmental forms, processes and structures should be redesigned to make them adaptable to e-Governance, backed by procedural, institutional and legal changes.

The current document, *Government Process Architecting Framework (GPAF)*, builds on the earlier generic guidance and provides a systematic guide for process architecting in government entities.

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1 Executive summary

1.1 Background

The National E-governance Plan (NeGP) envisages several Mission Mode projects (MMPs) that use modern technology to simplify delivery of services to citizens. The success of these projects not only depends on technology but also on the removal of redundant processes and the introduction of new or modified processes that overcome past inefficiencies, and optimally use the new technology. In its eleventh report, the Second Administrative Commission (ARC), observed that one of the lessons learnt from ongoing or completed e-governance projects was that "*business process re-engineering is a pre-requisite in case of complex projects*". The commission also went on to emphasize that business process re-engineering "*would form the backbone of e-governance initiatives*" and that *"business processes would in effect be changed fundamentally to allow the efficiency and transparency gains associated with e-government"*.

This document, *Government Process Architecting Framework* (GPAF) focuses on process architecture. It prescribes a standard methodology for re-architecting (or reengineering) the operational processes in a government organization.

1.2 Need for a standard organization-wide framework

In general, process changes are required when:

- The current processes are sub-optimal, and can be made more efficient even without introducing new technology.
- Technology introduces new features and capabilities that can make processes simpler and quicker.
- Operational siloes prevent seamless flow of information among organizations and within the organization.
- Duplication of services and resources between various wings of the government prevent standardization, and escalate cost.

While re-engineering processes, as part of an MMP, is certainly a step in the right direction, doing so individually is not the optimal route. The numerous functions and processes in the government are distinct yet inter-linked. Changes in one process can have an unintended effect on another. It is this inter-linkage between processes and functions that drives the need for a standard organization-wide process architecture framework that spans individual projects:

- Organizational functions are inter-related – changes in one affect another. Therefore process re-design requires an organization-wide approach.

- Though processes differ, there are conceptual similarities between all processes. For instance, all of them receive inputs, generate outputs, influence information, and perform some kind of services. This common conceptual foundation (discussed ahead) also supports the evolution of a common architecting methodology.

- All processes drive the reason for their existence from the organizational mission. It is the purpose of a process architecting framework to trace this connection and use it to significantly re-model existing processes or even eliminate unnecessary ones (that are not related to the mission). This step is sometimes glossed over by architecture teams. A standard framework will make it mandatory for architecture teams to perform this vital step.

- Process rationalization is a complex task that connects business processes with organization strategy and technology. A standard framework will ensure that teams entrusted with this important task exercise due diligence and rigor.

- A standard framework also facilitates the creation of a repository of good practices that can be re-used.

It is therefore important that the framework does not recommend an MMP-wise approach to process design but an organization-wide (or sector-wise) generic approach.

1.3 Conceptual foundation

The concept of 'process architecture' (and hence 'architecting') is to be viewed in the context of 'enterprise architecture'. The eleventh report of the second ARC emphasizes this relationship by stating that enterprise architecture should serve "*as an ideal platform for initiating the business process re-engineering exercise*". It also goes on to say, "*A well constructed enterprise architecture of an organization helps in understanding the linkage between vision, the mission and the functions of an organization. This exercise captures the inter-dependencies between the different parts of an organization. It helps in appreciation of the linkage between the objectives and activities of an organization and the relationships between the organizational processes and the technology.*"

Enterprise architecture is a rapidly emerging discipline that views an enterprise along several dimensions – strategy, organizational structure, technology, and business (or operational) processes. Enterprise architecture describes each of these views in a distinct yet related manner.

The fundamental principle of the GPAF is to work backward from the vision and goals of the organizations to the desired services and finally to the underlying processes and information requirements. By linking the goals of the organization to the services, it builds a solid rationale for eliminating unnecessary services, introducing new ones, and streamlining existing ones. By further

drilling down to the constituent processes, it provides a mechanism for deciding which process improvements will result in maximum value. Next, information requirements are studied because process optimization cannot be carried out without tailoring data inputs that go into processes. Finally, suggestions are made regarding the areas where computerization can help and broad IT application specifications defined.

The goal of process architecture is to rationalize the various activities and information requirements in an organization so that they effectively function together to produce the desired services.

1.4 The 'sector-as-a-whole' view

The Government of India is structured as a hierarchy of organizational units at various levels of aggregation – sections, divisions, departments, ministries, sectors, and state and union governments. Also included in this structure are autonomous bodies and attached/subordinate offices.

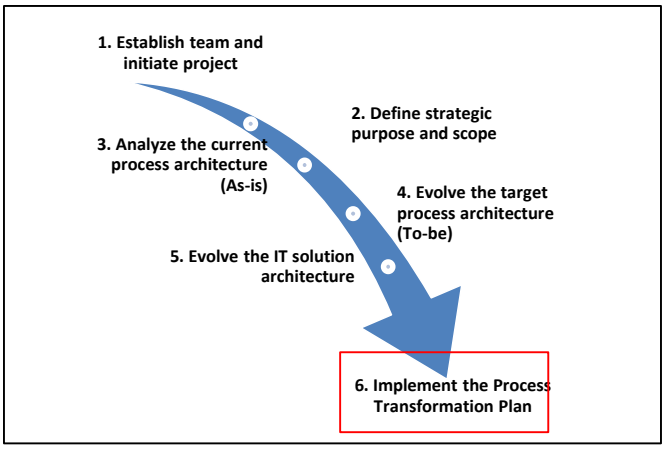
The GPAF recommends that the sector be treated as a seamless entity for the purpose of process rationalization. This means that process rationalization may affect processes that span multiple departments within the sector and can eliminate processes that are common between departments within the sector. It also implies that when a sector contains two or more MMPs, the framework should be applied seamlessly across the MMPs (not used individually by each MMP).

Each sector will be responsible for undertaking its own process re-engineering initiative. However, the DAR&PG will invite feedback and collate policy level generic procedural reforms from Ministries/Departments to inculcate the necessary changes in the relevant policy .

1.5 Methodology

Thus, in GPAF, process architecture development involves transforming processes across a sector. This transformation is to be executed as a project using the six-phase GPAF methodology:

i. Establish team and initiate project
ii. Define the strategic intent and scope of the architecture
iii. Analyze current (baseline) process and data architecture (As-is)
iv. Evolve the target process architecture (To-be)
v. Evolve IT solution architecture
vi. Formulate the implementation plan



1.5.1 Set up team and initiate project

This is the first phase in this methodology. It establishes the overall governance framework including the core team required to guide the architecture development. The phase includes establishing the overall governance framework, educating Executive Heads on the process and time commitment, selecting the Executive Sponsor, evolving the overall architecture mission, and forming the core execution team.

1.5.2 Define strategic intent and scope

In this second phase, the scope and strategic intent of the process architecture is defined. Since sectors may often cover a vast spectrum of functions or processes, not all of which need to be covered by the project, the focus of the architecture must be defined in the beginning. The phase aims at developing a comprehensive understanding of the relevant sector goals and desired outcomes, major strategic transformational opportunities, performance gaps, mandates and drivers, and common or mission-specific services. The phase consolidates these factors to lay the context and scope that determine the remaining steps of this methodology. Gathering and analysis of stakeholder needs and business drivers contributes in identifying strategic transformational opportunities.

1.5.3 Analyze current process architecture (As-is process)

The third phase analyses the current or “as is” environment. It links the performance and strategic goals of the Sector with specific processes, functions, services, and data requirements. The key to success in this phase is to analyze and document the requirements to the lowest level of detail necessary to form actionable recommendations.

1.5.4 Evolve the target process architecture (To-be-process)

This phase uses the findings from the previous phases to recommend a desired or target process architecture. The phase involves:

- Identifying the target state processes
- Deriving the information requirements (data architecture)
- Harmonizing the processes with the data architecture to arrive at the target process and data architecture

The objective will be to achieve the strategic transformational opportunities identified earlier, and to maintain compliance with information assurance and security mandates.

1.5.5 Evolve IT solution architecture

This phase includes activities that help the architect describe the IT solutions that are required to implement the target process and data architecture derived in the previous phase. The description is kept at a top-level, which can be used later by application designers to arrive at the detailed specifications of the IT solutions. Accordingly, this phase defines the broad service requirements, interfaces with the external world, system functionality, system boundaries, data entities, and interfaces between systems. As far as possible, the solution description should be kept vendor agnostic.

1.5.6 Prepare the transformation plan

The GPAF concludes with an implementation plan. The plan consolidates the findings, identifies associated transition options, assigns responsibilities, charts out milestones, and prescribes a monitoring framework.

1.6 Conclusion

The GPAF describes a six-phase methodology to rationalize the processes within a sector. Rationalization implies drawing a line of sight between the sector's goals and the operational processes so that redundant processes that do not add value are eliminated, and processes that are essential to the delivery of the critical services are optimized. Information requirements are spelt out in a structured manner that eliminates duplication and ensures security. Finally, by deriving the IT application requirements from the desired processes, the GPAF paves the way for managing the overall IT investment optimally.

2 Introduction

2.1 Purpose of the document

This document, *Government Process Architecting Framework* (GPAF), prescribes a methodology for re-architecting (or reengineering) the operational processes in a government organization.

2.2 Background

The National E-governance Plan (NeGP) envisages several Mission Mode projects (MMPs) that use modern technology to simplify delivery of services to citizens. The success of these projects not only depends on the technology used but also on new or modified processes that overcome past inefficiencies and optimally use the new technology.

It was in this context that the eleventh report of the Administrative Reforms Commission focused on the need to conduct a business process reengineering exercise in the Government of India. According to the report:

> *"the way government institutions conduct their business has evolved over a period of time and is codified in different Statutes, Rules, Regulations and procedural manuals enacted or formulated over a wide span of time (with many processes even continuing from the colonial period). On the other hand, the scope and complexities of governance along with the government machinery have expanded during the last few years. The advent of ICT has led to the recognition that these technologies provide a unique opportunity to redesign government processes not only to provide better services and reliable information to citizens but also to improve efficiency and effectiveness within government institutions.*
>
> a. *For every function, a government organization performs and every service or information it is required to provide, there should be a systematic analysis of each process to ensure its rationality and simplicity.*
> b. *Such analysis should incorporate the viewpoints of all stakeholders, while maintaining the citizen-centricity of the exercise.*
> c. *After identifying steps which are redundant or which require simplification, and which are adaptable to e-Governance, the provisions of the law, rules, regulations, instructions, codes, and manuals. which form their basis should also be identified.*
> d. *Following this exercise, governmental forms, processes and structures should be re-designed to make them adaptable to e-Governance, backed by procedural, institutional and legal changes."*

Since rationalizing processes is a complex task and often done in siloes, it was felt necessary to evolve a common standard methodology that all government departments could use. The

methodology would also synchronize with the Government of India's strategy on technology and communication. This document is an effort to cull together a set of practices that all government departments can adopt and customize if required to meet their business architecting needs.

2.3 Need for a standard organization-wide framework

While re-engineering processes as part of an MMP is certainly a step in the right direction, doing so in siloes is not the optimal route. The numerous functions and processes in the government are distinct yet inter-linked. Changes in one process can have an unintended effect on another. It is this inter-linkage between processes and functions that drives the need for a standard organization-wide process architecture framework that spans individual projects:

- Organizational functions are inter-related – changes in one affect another. Therefore process re-design requires an organization-wide approach.
- Though processes differ, there are conceptual similarities between all processes. For instance, all of them receive inputs, generate outputs, manipulate information, and perform some kind of services. This common conceptual foundation (discussed ahead) also supports the evolution of a common architecting methodology.
- All processes drive the reason for their existence from the organizational mission. It is the purpose of a process architecting framework to trace this connection and use it to significantly re-model existing processes or even eliminate unnecessary ones (that are not related to the mission). This step is sometimes glossed over by architecture teams. A standard framework will make it mandatory for architecture teams to perform this vital step.
- Process rationalization is a complex task that connects business processes with organization strategy and technology. A standard framework will ensure that teams entrusted with this important task exercise due diligence and rigor.
- A standard framework also facilitates the creation of a repository of good practices that can be re-used

It is therefore important to note that the framework does not recommend an MMP-wise approach to process design but an organization-wide (or sector-wise) approach.

2.4 Core philosophy

The GPAF adopts the following core principles to guide its strategic direction:

Charter-driven: The GPAF should be closely aligned with government strategic plans and executive level direction. The National e-Governance Plan (NeGP), government policies,

department performance goals, and departmental heads give direction to each department's business architecture.

Active collaboration: Adoption of the GPAF is achieved through active participation of government organizations.

Effectiveness and efficiency: Process architecture improves the effectiveness and efficiency of government resources. No IT investment should be made without approved process architecture.

2.5 'Sector-as-a-whole' view

The Government of India hierarchy consists of organizational units at various levels of aggregation – sections, divisions, departments, ministries, sectors, and state and union governments. Also forming part of the hierarchy are autonomous bodies and other affiliated organizations. A process rationalization exercise could span one or more of these organizations.

Since rationalization involves identifying commonalities between processes and eliminating duplicates, the wider the organizational span considered, the more effective the rationalization. As a sector is one of the highest levels of organizational aggregation (and yet not high enough to make the aggregated entity too complex), the GPAF recommends a consolidated view of the process architecture of a sector. As amplified later, this consolidation implies evolving a set of harmonized goals across the sector, which when cascaded down helps eliminate artificial and sometimes inefficient boundaries between departments.

A sector is a group of related government entities (such as departments or autonomous bodies) that form a unit across which a process re-architecting initiative is to be seamlessly executed. Because the entities in a Sector are related functionally or share resources with each other, the GPAF expects a sector to offer significant opportunities for process rationalization across organizational boundaries. A sector contains a hierarchy of Ministries, departments, autonomous bodies, and other organizational entities.

The following is the list of sectors identified on the 'National Portal of India' (http://india.gov.in/):

- Agriculture & Cooperation
- Animal Husbandry & Fisheries
- Art & Culture
- Chemicals & Fertilizers
- Coals & Mines
- Commerce & Industry
- Communications & Information Technology
- Defence
- Education & Training
- Employment and Labour

- Energy & Power
- Environment & Natural Resources
- Finance, Banking & Insurance
- Food & Public Distribution
- Forestry & Wildlife
- Governance & Administration
- Health & Family welfare
- Home affairs & National Security
- Housing & Urban Development
- Information & Broadcasting
- External Affairs
- Law & Justice
- Petroleum, Oil & Natural Gas
- Rural Development & Panchayati Raj
- Science, Technology & Research
- Social Justice & Empowerment
- Tourism
- Transport & Infrastructure
- Youth Affairs & Sports

2.6 Methodology overview

Every sector is required to initiate its own process architecture project and follow the methodology outlined in this GPAF document to implement it. A Steering Committee comprising of Executive Heads from the sector will oversee the project and set up a working level group to handle day-to-day execution.

The following are the main phases in the GPAF methodology:

I. Establish team and launch project
II. Define the strategic purpose and scope of the architecture
III. Analyze current (baseline) process and data architecture (As-is)
IV. Design the target process architecture (To-be)
V. Evolve IT solution architecture
VI. Formulate the transformation blueprint and its implementation

The figure below graphically represents the GPAF phases.

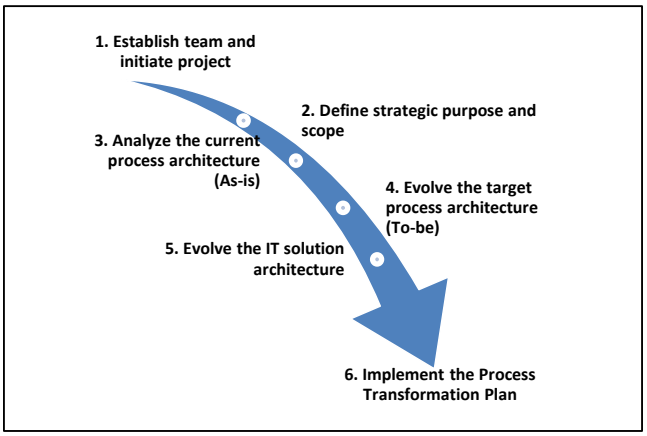
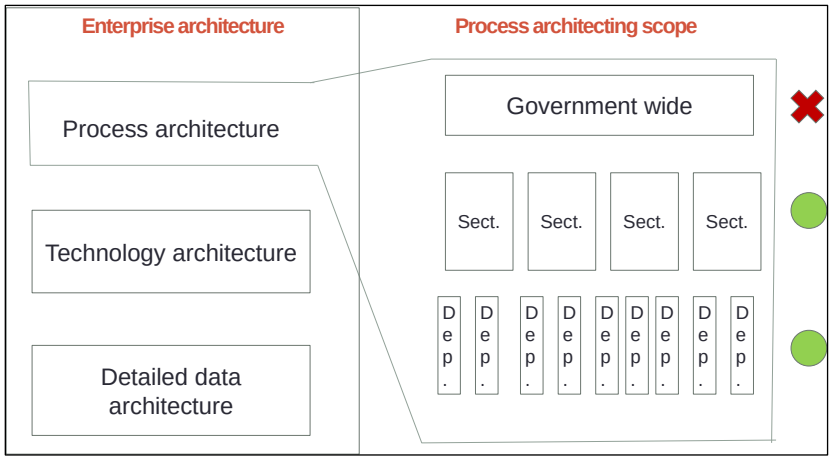


FIGURE 1: GPAF METHODOLOGY

The idea of GPAF must be viewed in the context of 'enterprise architecture'. The theory of enterprise architecture views an enterprise along several dimensions – strategy, organizational structure, technology, and business (or operational) processes. Enterprise architecture describes each of these views in a distinct yet related manner. The figure below depicts the various components of enterprise architecture. It also illustrates the idea of an individual sector being the top-level entity for application of the GPAF.



The fundamental principle of the GPAF is to work backward from the vision and goals of the organizations to the desired services and finally to the underlying processes and information requirements. By linking the goals of the organization to the services, it builds a solid rationale for eliminating unnecessary services, introducing new ones, and streamlining existing ones. By further drilling down to the constituent processes, it provides a mechanism for deciding which process improvements will result in maximum value. Next, information requirements are studied because process optimization cannot be carried out without tailoring data inputs that go into processes.

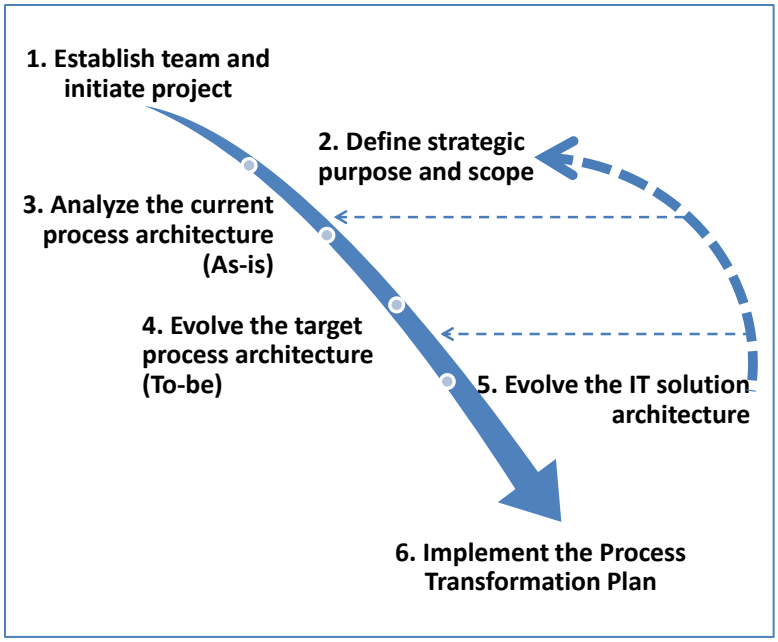
Finally, suggestions are made regarding the areas where computerization can help and broad IT application specifications defined.

Every organization can be decomposed into functional units, each of which performs a set of interlinked activities. There are two related but different ways to classify these activities – 'functions' and 'processes'. For instance, the accounts function in an organization performs activities related to updating the books of accounts of the organization. Activities that are clubbed together into a 'function' usually require similar skills. The activities constituting a function are not required to be performed sequentially. However, when activities are clubbed together to form a sequential chain they form a 'process'. A process usually results in the output of goods and services to the external world. These outputs are called 'services'. The content and source of data used by a process at various stages is collectively referred to as data architecture'. The network of functions, processes, services, and information requirements is collectively referred to as process architecture in the GPAF.

The goal of process architecture is to rationalize the various activities and information requirements in an organization so that they effectively function together to produce the desired services.

2.7 Waterfall versus iterative approach

In the context of process architecture development, two approaches which can be adopted are the 'waterfall' approach and the 'iterative' approach. A waterfall model will look at the six phases in sequence. In practice, real life system or process development proceeds iteratively through the various stages. A process or system model progresses iteratively from a generic representation to a more granular and detailed representation. The usefulness of a process architecture is enhanced if the methodology used is iterative and assimilates knowledge gained during the development process from consultations, experiential insights, and stakeholder involvement. This GPAF recommends an iterative approach as depicted in the figure below:



2.8 Definitions

Activity: An activity is the general term for a unit of work that forms the subject of analysis in the GPAF. Activities can be decomposed into sub-activities (which are also called activities). The lowest level to which an activity needs to be decomposed depends on the analyst, though this GPAF recommends the One person one place one time (OPOPOT) criteria for determining the granularity at which an activity needs to be analyzed.

Architecting process (or methodology): The formal process (or methodology) for creating or modifying architecture (of an organizational unit)

Architecture: This is the collective term representing the structure of the various components of an organizational unit (services, processes, functions, organizational units, information, information sources, computer systems, and technology) and their inter-relationships. The ISO/IEC definition is: "*The fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution.*"

Baseline model: A baseline is the reference state (usually current) against which improvements or other changes are compared. Used in the context of process or data architecture, the term baseline model refers to the original or initial state of the architecture.

Consumer: A consumer (of a service) is the external entity (e.g. individual, business firm) or internal entity (e.g. function or organizational unit) that utilizes a service.

Data architecture: The term data architecture refers to the information required by processes and the sources of this information.

Executive Head: An Executive Head is a senior officer in a department with executive decision-making authority within the sector. In the Steering Committee, the Executive Head represents one of the organizations that comprise the sector.

Executive Sponsor: The Executive Sponsor is a member of the Steering Committee who can represent other members of the Steering Committee in other forums.

Organizational unit (OU): An organizational unit is the general term for an entity (within the Government) that has a well-defined management structure. An OU can be as small as a section and as large as a sector. The term is used interchangeably with the term organization, though as far as possible, the latter term is used for larger OUs (such as departments).

Process architecture: Process architecture is the collective term representing the various processes (along with their constituent activities), functions, organizational units, and information requirements.

Process flow model: A process flow model is a collective representation of the various processes in an organization.

Process: A process is a group of sequential activities that results in a service.

Sector Architecture Steering Committee (SASC): The SASC is the apex sector-level body responsible for overseeing restructuring of processes within the sector. The SASC consists of executive heads from organizational units in the sector. Designed to provide executive leadership, vision, direction, and support the SASC sets policy and strategy, secures funding, appoints key personnel to the SAWG, and makes other decisions as required.

Sector Architecture Working Group: The SAWG is a working level body of individuals that manage the architecture development process. It typically consists of program managers and subject matter experts from within the sector. The SAWG may be extended to include other key stakeholders and IT personnel, such as cyber security experts.

Sector: A sector is a group of related government entities (such as departments or autonomous bodies) across which a process re-architecting initiative is to be seamlessly executed. Because the entities in a sector are related functionally or share resources with each other, a sector offers significant opportunities for process rationalization across organizational boundaries.

Service: The term service refers to any output produced by an OU for the outside world or for other

OUs. Services can be consumed by other OUs (in which-case they are called 'internal services') or by the external world (in which case, they are called 'external services').

Use case: A use case is a formal description of steps or actions between a user (or "actor") and a system.

3 Phase I: Establish team and initiate project

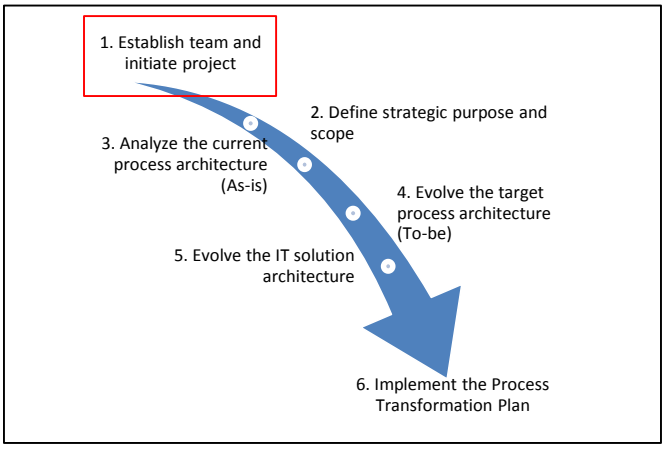
3.1 Phase description and purpose

This is the first phase in the GPAF methodology. As mentioned in the introduction chapter, every sector is required to initiate and manage its process architecture development as a formal project. Accordingly, the phase 'Establish team and initiate project' kicks off the project by establishing the project governance framework. The phase structures the governance framework, evolves the overall architecture mission, and forms the core team for managing the architecture development at the working level.

The Sector Architecture Steering Committee (SASC) is the apex level of the governance framework established during this phase. The committee comprises of 'Executive heads' from the departments in the sector and an 'Executive sponsor' selected from amongst the executive heads. The executive sponsor will represent the other executive heads in other forums, and be the link between the SASC and the working groups. Since any recommended process changes may result in policy or regulatory changes, it is important that the executive sponsor has the influence to champion and drive needed changes.

The Sector Architecture Working Group (SAWG) is another important component of the governance framework. It is a standing group containing project managers and subject matter experts (SMEs), who manage the architecture development at the working level.

The primary document deliverable from this phase is the Sector Architecture Mission Statement (SAMS). The SAMS clarifies the primary intent of the steering committee. This mission statement will be used by working level groups to prioritize the improvement opportunities identified later.



The following sections explain the phase activities in greater detail.

3.2 Activities

The main activities in this phase are:

i. Establish the Sector Architecture Steering Committee (SASC)

ii. Formulate the Sector Architecture Mission Statement (SAMS)

iii. Set up the Sector Architecture Working Group (SAWG)

iv. Develop the project charter and schedule

3.2.1 Establish the Sector Architecture Steering Committee (SASC)

The phase begins with the setting up of a 'Sector Architecture Steering Committee' (SASC) for overseeing the implementation of the GPAF in the Sector. The SASC will comprise of executive heads from each department within the sector and their equivalents from other related organizational units.

The executive heads will nominate an executive sponsor from amongst themselves, who should be willing to champion process transformation within the sector. The executive sponsor will represent the other executive heads on lower-level committees and groups, and will be the link between the steering committee and working level groups. The executive sponsor will be a visionary leader for the SAWG (described ahead), who will play a key decision-making role in determining the direction and scope of the sector architecture. The executive sponsor should therefore be a senior official with the authority to make decisions within the sector.

The steering committee will determine for itself its own schedule of meetings, the list of architecture artifacts that need to be approved by it, and the approval process.

3.2.2 Formulate the Sector Architecture Mission Statement (SAMS)

It is important for the Steering Committee to specify the intent behind the sector architecture development. It does so in a document known as the 'Sector Architecture Mission Statement' (SAMS). Some examples of missions that could be considered are 'higher citizen satisfaction', 'lower costs', or 'efficient operations'.

The SAMS should be a high-level statement of principles –-with the clarity and specificity required to guide the architecture development. It is particularly important for sectors that span multiple departments, multiple executive heads, and multiple objectives. As different organizations have different (though related) motivators and mandates, the SAMS provides the opportunity to arrive at a common set of expectations across the departments in a sector that is useful at the working level.

The steps to formulate the SAMS are as follows:

a. Examine the operational and strategic issues facing each executive head

Since a sector could be a composite of ministries, departments, and other organizations, each organizational entity within the sector is likely to have its own specific challenges. A meeting of executive heads facilitated by the executive sponsor is an ideal way to determine the issues of pressing importance. Issues to consider should include strategic plans, policies, executive orders, legislation, and budget priorities.

b. Synthesize the common challenges across the Sector

Since the executive heads operate within the same sector, they are likely to face common challenges. A meeting called by the executive sponsor is the opportunity to drive consensus on common issues or priorities so that all working level groups have a clear direction and do not expend time determining the leadership's intent.

The executive sponsor will communicate to the executive heads how well designed process architecture can help address the issues or challenges faced by the sector and inspire concrete actions within the sector. The architecture can help with process optimization, improved information sharing, optimal use of investments, and better formulation of services to citizens.

c. Formulate the Sector Architecture Mission Statement (SAMS)

The common challenges and issues identified above will form the basis for the mission statement driving the architecture design. This statement, called the Sector Architecture Mission Statement (SAMS) should be a concise and clear articulation of the top level goals, major challenges or issues that the executive heads would like to see addressed by the process architecture. It should be clear enough to ensure that the working level groups understands expectations and develops an actionable architecture accordingly. Appendix 1 shows a sample mission statement template.

3.2.3 Establish the Sector Architecture Working Group

After formulating the Sector Architecture Mission Statement, the Steering Committee will need to set up a group at the working level to drive the architecture development process in the sector. This is the Sector Architecture Working Group (SAWG). A knowledgeable, enthusiastic and constructive SAWG is an essential step for the valid, relevant or implementable. This activity involves the executive sponsor selecting the best and brightest subject matter and project management experts from departments within the sector. Ideally, all departments and other affected organizations need to be represented on the SAWG.

The composition of the SAWG is crucial to the success of the project. It typically consists of people with program management skills, who are subject matter experts in the sector and key sector stakeholders. SAWG members should be constructive, able to think outside of a single organizational context, good communicators, visionary, and interested in change. The SAWG may also consider inviting other subject matter experts for advice, whenever needed, to supplement their knowledgebase as they move through the architecture development process. The important

element of the SAWG is that it is a functional team having the knowledge and vision to develop an actionable architecture document.

The steps to establish the SAWG are as follows:

a. Establish the purpose of the SAWG

It is important to educate the executive heads on the role of the SAWG. The SAWG is the key group of working level resources that will help shape and develop the target state for the sector. These resources should be domain experts from the sector. Overall, the SAWG members should contribute significant amount of time working on the architecture project.

b. Identify roles required

The SAWG will contain some or all of the following roles:

i. The executive sponsor (identified above)
ii. A chief architect
iii. One or more business analysts
iv. One or more process architects
v. One or more data architects
vi. One or more application architects
vii. A project manager
viii. One or more IT application designers

Some of these members need to be available on demand and others on a full-time basis.

c. Identify skills required

The SAWG is expected to have the following kinds of skills to a varying degree, depending on role:

- Generic skills: leadership, teamwork, inter-personal skills
- Functional skills: business cases, business process, strategic planning
- Enterprise architecture skills: modeling, building block design, applications and role design, systems integration
- Program or project management skills: managing change, project management methods and tools
- General IT knowledge: top-level knowledge of applications, asset management, migration planning, and Service Level Agreements (SLAs)
- Technical IT skills: software engineering, security, data interchange, data management
- Legal environment: data protection laws, contract law, procurement law, and fraud

d. Determine personnel to be appointed to the SAWG

In most cases, the SAWG will be appointed by the executive heads or the executive sponsor. This task usually involves active interaction between executive heads (or executive sponsor) and

prospective SAWG members to ensure that desired personnel are available and can contribute time to the architecture development.

The SAWG project manager should be a senior officer in one of the departments in the sector. Other personnel could be selected from within or outside the government, depending on where such skills are readily available. Ideally, the more the government staff, the more influential will be the SAWG. However, the need for in-house staff must be balanced with the need for expertise in niche areas, such as process re-engineering, and application and data architecture, which could be more readily available outside.

e. Communicate the formation of the SAWG

Once appointments have been determined, the concerned personnel should be intimated through a formal communication channel. This could be via one-on-one conversations with the appointed individuals or a group introduction. Subsequent to these meetings, a formal order or other communication announcing the formation of the SAWG is essential. The profile of the SAWG members should be captured in the SAWG Team Roster (Appendix 2) and published on the project portal for common viewing.

3.2.4 Create project charter and project schedule

As mentioned earlier, the architecture development within a sector will be managed as a project with a documented, detailed plan. The project charter is one of the main constituents of this plan. The charter formalizes the SAWG's role in the sector architecture development. It is a statement of the scope, objectives, and participants in a project. As it is approved by the Steering Committee, it forms the basis of the SAWG's authority. It delineates roles and responsibilities of various stakeholders, outlines the project objectives, identifies the main stakeholders, stipulates operational ground rules, defines the decision-making structure, and establishes the authority of the project manager.

a. Develop Sector Architecture Project Charter (SAPC)

The SAPC should include the role of the SAWG members, the roster of the SAWG team, the decision-making structure for the SAWG, the SAMS, and the preliminary scope of the project. It should also explain how the SAPC aligns with the overall mission. Appendix 3 contains a template for developing the SAPC.

b. Create Sector Architecture Project Schedule (SAPS)

A Sector Architecture Project Schedule (SAPS) is needed to detail the milestones and proposed dates for the architecture development. The SAPS will help ensure that the architecture is developed within a stipulated timeframe.

c. Review and approve the project charter and project schedule

The project charter and schedule should be reviewed and approved by the Sector Architecture Steering Committee (SASC). This approval will authorize the SAWG to commence the project and communicate to the affected organizations the governance framework and overall purpose of the architecture project.

3.3 Phase- I synopsis

Phase I witnesses the formation of the Sector Architecture Steering Committee (SASC) and the Sector Architecture Working Group (SAWG), and the evolution of the project charter and schedule. All artifacts are presented to the steering committee, based on whose approval, the SAWG receives its authority to manage the project and move to the next phase.

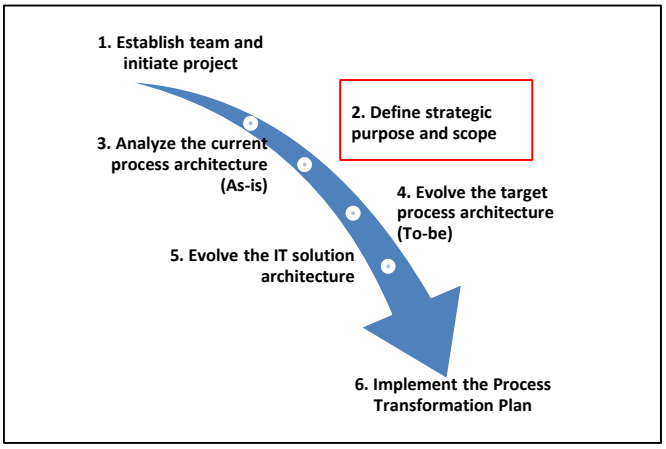
The table below presents Phase 1 activities at-a-glance.

S. No.	Activity	Inputs	Outputs	Activity owner	Approver
1.	Establish the Sector Architecture Steering Committee (SASC).	• List of affected organizations and their Executive Heads • Department plans, policies, orders	• SASC • Executive Sponsor	• Department Heads	Sector leadership
2.	Formulate the Sector Architecture Mission Statement (SAMS).	• Department plans, policies, orders	• SAMS	• SASC	SASC
3.	Set up the Sector Architecture Working Group (SAWG).	• SAMS • Sector organization structure	• SAWG • SAWG team roster	• SASC	SASC
4.	Develop the project charter and schedule.	• SAMS	• Project charter • Project schedule	• SAWG	SASC

4 Phase II: Define strategic purpose and scope

4.1 Phase description and purpose

Phase II details the scope and strategic intent of the process architecture based on the mission statement (SAMS) produced by the steering committee. Since sectors may often cover several mandates, and a vast spectrum of functions or processes, it is necessary to focus on what is critical to the architecture development. The phase does so by relating the main goals of the sector to its process architecture. Analysis of the current state of the sector throws up major strategic transformational opportunities, and performance gaps in the sector, which can be connected to the mandates and mission-critical services of the sector. The conclusions are summarized in an architecture vision statement.



The following sections explain the phase activities in greater detail.

4.2 Activities

The main activities in this phase are:

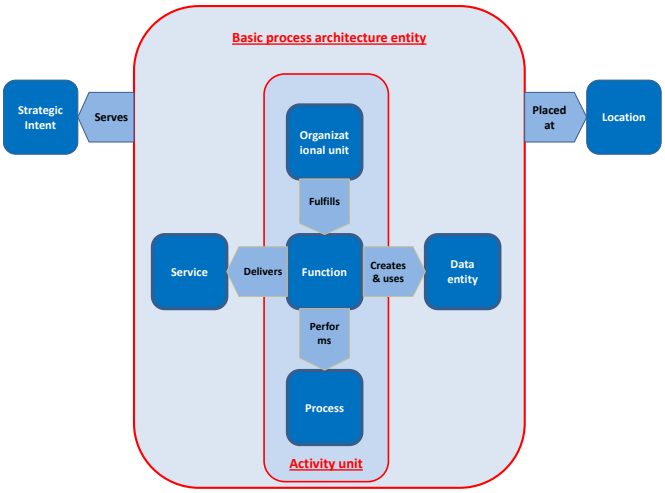
i. Identify architecture components
ii. Identify stakeholders
iii. Determine stakeholder requirements
iv. Conduct organizational capability analysis
v. Identify strategic transformational opportunities
vi. Establish performance goals
vii. Identify project risks
viii. Determine the target architecture vision

The primary input to the phase is the Sector Architecture Mission Statement.

4.2.1 Identify architecture components

This step results in an architectural view of an organization. An architectural view is a componentized view of the organization. Architecture components may include organizational units, functions, processes, services, software systems, and information exchanges.

The following figure depicts the generic relationship between various architecture components (Architecture metamodel).



The main deliverable in this step is the 'sector abstract' containing essential top-level details. This sector abstract will be used downstream in various phases. Appendix 4 is a sample template of a sector abstract.

4.2.2 Identify stakeholders

This task identifies those individuals or entities that are likely to be affected, directly or indirectly, by the architecture mission (articulated in the SAMS). These 'stakeholders' could be from among the following categories:

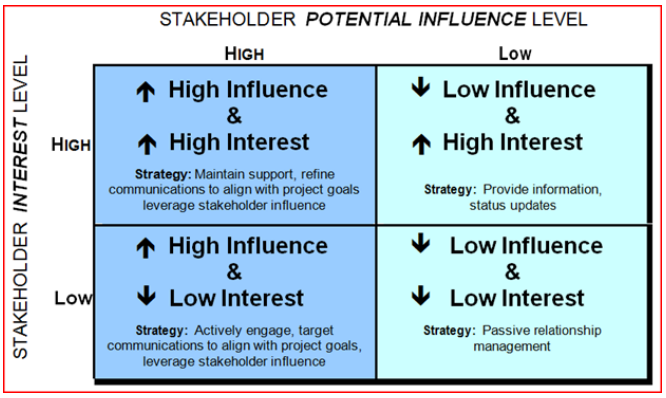
- Citizens
- Employees
- Vendors
- Others

The task produces a list of stakeholders, and documents the relationships between them and the sector.

4.2.3 Determine stakeholder requirements

Stakeholders may have divergent perspectives on how to overcome the business challenges articulated in the SAMS. It is necessary to review the aspirations of different stakeholders and assess their respective degrees of influence. This task studies the needs of stakeholders in the context of the architecture mission. It produces a statement of stakeholder needs that is critical for ensuring that stakeholders stay motivated and engaged during the architecture development process.

It would be useful to categorize stakeholders according to their degree of influence and interest. The following figure provides a framework for evaluating stakeholders. Stakeholders can be slotted into the four quadrants and appropriate strategies evolved for each quadrant.



Depending on the quadrant into which stakeholders fall, the strategies for engaging them can be evolved. These could range from working sessions of stakeholders to surveys that collect stakeholder data for analysis later. Some of the stakeholders have to be involved right through the process, while others need only be involved in the beginning or end. The SAWG can choose the engagement process depending on the working environment and precedents.

A stakeholder catalogue template that illustrates how stakeholder needs are captured is shown in Appendix 5.

4.2.4 Conduct organizational capability analysis (SWOT)

Once stakeholder needs have been identified, and their role in the project crystallized, a capability analysis (Strengths, weaknesses, opportunities, and threats – SWOT) is carried out to identify the opportunities for improvement.

> **In the here and now (strengths and weaknesses):** Identify all strengths and weaknesses that exist currently (and are known prior to the architecting process).
> **What might be (opportunities and threats):** Identify existing gaps and future opportunities that are potential strengths. Also, identify the threats that exist, as they are potential future weaknesses.

Action plan: Based on the SWOT matrix create an action plan that addresses the four areas. Strengths need to be consolidated or leveraged. Weaknesses need to be remedied or eliminated. Opportunities need to be prioritized and optimized. Threats need to be countered or minimized.

	Helpful To achieving the objective	**Harmful** To achieving the objective
Internal (attributes of the organization)	**Strengths** **Good Now** *1 Maintain* *2 Build* 3 *Leverage*	**Weaknesses** **Bad Now** *4 Remedy* 5 *Stop*
External (attributes of the environment)	**Opportunities** **Good Future** *6 Prioritise* 7 *Optimise*	**Threats** **Bad Future** *8 Counter*

Appendix 6 depicts a sample SWOT report template.

4.2.5 Evaluate strategic options

The analysis carried out during the previous tasks of stakeholder needs and the SWOT assessment provide sufficient information for the SAWG to identify transformational opportunities at a strategic level. Inclusion of a new service, improvement of the service level of a service, automation of a functional area or process, reorganization of functions within the sector, rationalization of data sources, or introduction of new technology, are examples of such strategic transformational opportunities.

Wherever possible, the prioritization of strategic opportunities should reflect opportunities for meeting some of the stakeholder needs, leveraging some of the strengths and opportunities identified in the SWOT analysis, removing or mitigating the weaknesses and potential threats identified in the SWOT analysis, and otherwise improving performance, reducing cost, and enhancing citizen satisfaction.

Appendix 7 illustrates how to arrive at strategic architecture transformation options.

4.2.6 Establish performance goals

The next task is to map the strategic transformational opportunities identified in the previous step to concrete outputs or tasks (called performance goals). A useful performance goal will draw a connecting line between the strategic goals of the sector and its investments in information technology and other areas. This connecting line will show how strategic performance goals (top level goals) are supported by programme level performance goals, which in turn are supported (if applicable) by investments.

GPAF does not propose any particular performance scorecard or measurement system. Any existing system of performance measurement can be used if available, or a new one developed. Whichever scorecard is used, it should be capable of providing a complete picture of sector performance from the highest level of strategic performance down to operational results and investment performance.

4.2.7 Identify risks

The task identifies high-level risks that could potentially derail the project (e.g. security and privacy issues). Some of the main risk categories are:

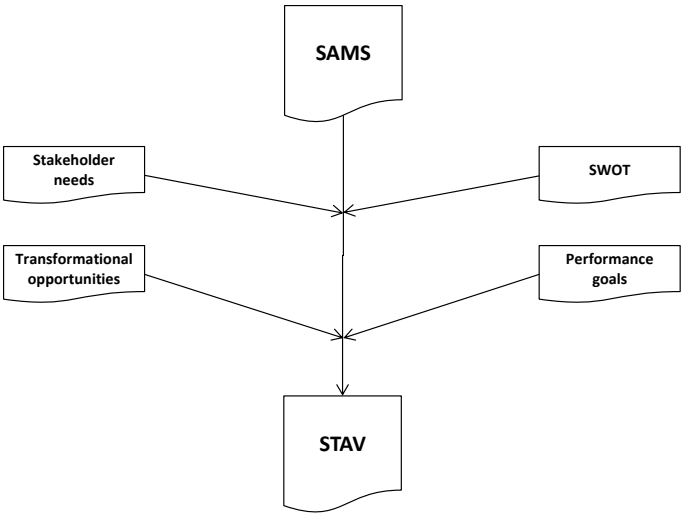
- Performance gaps
- Service level drop
- User dissatisfaction
- Employee dissatisfaction
- Security issues
- Privacy considerations
- Other legal issues

Working collaboratively with the relevant stakeholders, the SAWG identifies high-level strategies for mitigating potential risks. For instance, the SAWG can facilitate discussions to identify adequate security controls for addressing potential issues regarding confidentiality, integrity and availability of key services and functions. Appendix 8 provides a sample risk catalogue.

4.2.8 Determine the target architecture vision

This task produces the final deliverable of this phase - a high-level description of the desired or target architecture. It provides an executive summary of stakeholder needs and interactions, and the specific strategic opportunities determined in this phase along with the desired outcomes and performance indicators. The may use scenarios to describe the outcome of various strategic transformational opportunities to clarify the vision.

The following diagram depicts the relationship between the various artifacts created in this phase and explains how they culminate in the Sector Target Architecture Vision.



Appendix 9 contains a sample target architecture vision template.

The STAV should be presented to the Steering Committee for approval. A presentation including the Sector scope and strategic objectives should be prepared by the SAWG. The Chief Architect can conduct a detailed workshop-based review of these artifacts.

4.3 Phase-II synopsis

Phase II identifies the architecture components and stakeholders, determines stakeholder requirements, notes strengths and weaknesses, analyzes potential opportunities and threats, assesses risks, and summarizes the results in a target vision statement.

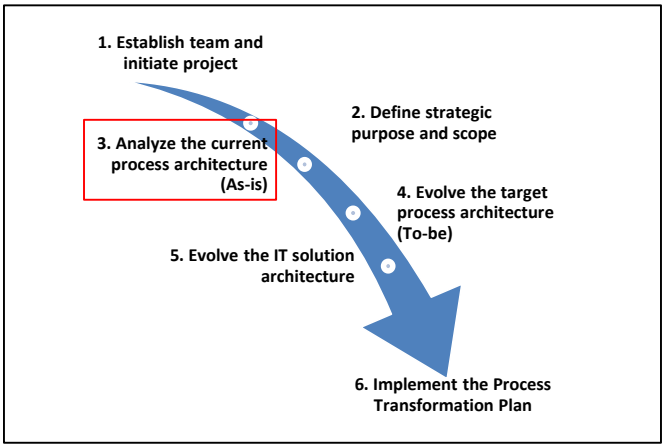
S. No.	Activity	Key Inputs	Outputs	Activity owner	Approver
	Identify architecture components	• Available documentation on sector organization, functions, systems, and services • Interviews with key functionaries	• Sector abstract	SAWG - Chief architect	SAWG
	Identify stakeholders	• SAMS • Sector abstract • Interviews with key functionaries	• Key stakeholder list	SAWG - PM	SAWG
	Determine stakeholder requirements	• SAMS • Sector abstract • Stakeholder list • Interviews with key	• Stakeholder catalogue	SAWG- PM	Executive sponsor

		functionaries • Interaction with key stakeholders			
	Conduct SWOT analysis	• Sector abstract • Stakeholder catalogue	• SWOT report	SAWG – Analyst	SAWG
	Identify strategic transformational prospects	• SAMS • SWOT report	• Strategic transformational prospects statement (STPS)	SAWG – Analyst	Executive sponsor
	Establish performance goals	• Organizational abstract • SAMS • STPS	• Performance scorecard	SAWG – PM	Executive sponsor
	Identify project risks	• SWOT report • SAMS • STPS	• Risk catalogue	SAWG – PM	SAWG
	Determine the sector target architecture vision	• STPS • SAMS	• Sector target architecture vision statement (STAV)	SAWG – Chief Architect	SASC

5 Phase III: Analyze current process architecture [As-is process]

5.1 Phase description and purpose

The third phase analyses the current or "as is" environment. It links the performance and strategic goals of the Sector with specific processes, functions, services, and data requirements. The key to success in this phase is to analyze and document the requirements to the lowest level of detail necessary to form actionable recommendations.



The following sections explain the phase activities in greater detail.

5.2 Activities

This phase consists of the following activities:

i. Define the baseline function model
ii. Define the baseline service model
iii. Define the baseline process model
iv. Define the baseline data architecture

5.2.1 Compose the baseline 'function model'

A 'function' is a grouping of activities usually requiring similar competencies or knowledge. A function defers from a process in that activities comprising a function do not necessarily have a sequential dependence between themselves. Examples of functions include accounting, finance, procurement, and budgeting.

A 'Function model' is a hierarchical representation of all functions in an organizational unit along with their constituent activities. Defining the function model implies tracing the function hierarchy from the highest level downwards, by exploding the functions into sub-functions and activities. Though the appropriate level of decomposition will depend on the complexity of the processes, a convenient rule of thumb is the "one-person-one-place-one-time" (OPOPOT) rule. The rule states that on reaching an activity that is performed by one person (or system) at one place and at one time, it is usually not necessary to decompose the activity further.

Appendix 10 presents a sample function model.

5.2.2 Define the baseline service model

This step examines the key services in an organization and reviews their outputs, inputs, and information requirements. The term service refers to any output produced by an organizational unit (OU) for the outside world or for other OUs. Services can be consumed by other OUs (in which-case they are called 'internal services') or by the external world ('external services').

A 'service model' represents the key external and internal services delivered by a sector. Service level agreements (SLAs) and other performance considerations are also included in the representation.

The following are the main steps involved in the preparation of the service model:

a. Determine outputs of 'external' services

Identify the services consumed by external entities and the needs they meet. Include Service Level Agreements (SLAs) wherever present.

b. Define the outputs of inter-function services ('internal' services)

Describe how functions cooperate by providing services to each other. Include any operational agreements between functions wherever present.

Appendix 11 presents a sample template of a service model.

5.2.3 Define the baseline process model

The next step is to analyze the processes related to the functions and services identified earlier. A 'process' is a group of sequential activities that results in a service. Like a function, a process is also a group of activities. The difference lies in the fact that processes comprise of sequential activities while functions represent a cluster of related activities that do not necessarily have sequential dependencies between themselves.

A 'process model' is a collective representation of the various processes in an organization. It describes the activities that comprise the various processes, and the inter-relationships between

them. To develop the process model, the architect works backward from the services to determine the activity chain that delivers the services. Interactions across organizational unit boundaries or functional demarcations should be described so that ownership and accountability can be analyzed. These interactions can be described using 'swim-lane diagrams'. A **swim lane diagram**, sometimes called a cross-functional diagram, is a process flowchart that provides information on who does what. In many instances, the analysis of the organizational or functional relationships between processes and activities can yield useful insight on current issues.

Appendix 12 contains a sample template of a process model.

Besides swim-lane diagrams, a process model also contains use cases to describe a process in detail. A use case is a formal description of steps or actions between a user (or "actor") and a system which constitute a process. The user or actor might be a person or something more abstract, such as an external software system or manual process. Appendix 13 contains a use case template.

5.2.4 Define the baseline data entity architecture

Though a detailed analysis of data architecture is not within the scope of the GPAF, it is imperative to identify information requirements at a top level (called the entity level) as no analysis of processes can be complete without an understanding of related information inputs. Through the documentation of the processes and information flows, the architect should become familiar with the information requirements critical to the various processes. Therefore, this GPAF recommends a top-level analysis of the data entities referenced by the processes.

The development of data architecture involves the following sequence of steps:

a. Determine high-level process information requirements

This step captures the information exchange between various activities. Though included here, this step should be undertaken when the process model is developed.

b. Identify data sources and establish data relationships

This step identifies the sources (and data stores) of the various data entities identified in the earlier step. It documents how the various services (and therefore processes) reference these data entities. Are the various processes 'creating', 'reading', 'updating' or 'deleting' (CRUD) these data entities? Appendix 15 depicts a sample service-data matrix that depicts this 'CRUD relationship'.

5.3 Phase-III synopsis

Phase III defines baseline versions of the function model, service model, process model, and data architecture. All documents are submitted to the SAWG for approval to move on to next phase.

S. No.	Activity	Key inputs	Primary outputs	Activity owner	Approver
1.	Define the baseline function model	• Sector abstract • Interviews with functionaries	• Baseline function model	SAWG - Process architect	SAWG – PM
2.	Define the baseline service model	• Baseline function model	• Services catalogue	SAWG – Process architect	SAWG – PM
3.	Define the baseline process model	• Baseline function model • Baseline service model	• Baseline process model • Use case catalogue	SAWG – Process architect	SAWG – PM
4.	Define the baseline data architecture	• Baseline function model • Baseline service model • Baseline process model	• Baseline data architecture model • CRUD model	SAWG – Information architect	SAWG – PM

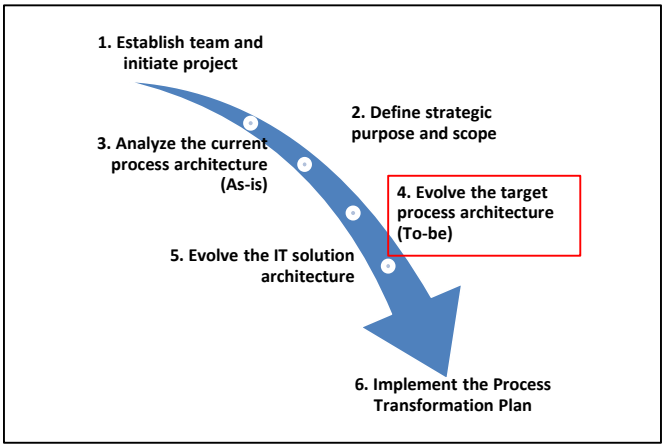
6 Phase IV: Evolve the target process architecture [To-be process]

6.1 Phase description and purpose

This phase uses the findings from the previous phases to propose the desired or target processes. The phase involves:

- Identifying the target state processes
- Deriving the information requirements (data architecture)
- Integrating the processes with the data architecture to arrive at the target process and data architecture

The objective of the phase is to achieve the strategic transformational opportunities identified earlier.



The following sections explain the phase activities in greater detail.

6.2 Activities

The phase involves the following activities:

i. Determine enhancement prospects in the process and data architecture

ii. Describe the target process and data architecture

6.2.1 Determine enhancement prospects in the process and data architecture

The objective of this activity is to analyze the gap between the current and required processes in the context of the strategic transformational opportunities identified in Phase II. The activity also proposes required changes to the data architecture.

The activity involves the following steps:

a. Align the strategic transformational opportunities to the process and data architecture

The previous phases and steps resulted in a mix of information at a low-level (on processes and data) as well as at a strategic level. The next step is to link the process and data information with the strategic information and determine what changes, if any, need to be made. The analysis could help identify duplicate processes that connect to the same end goal and hence are redundant. The linkage could also result in a refinement of the strategic transformational opportunities. For instance, the architects might conclude that a new service needs to be introduced. This will require change in the Sector Target Architecture Vision statement, the new version of which will be prepared and sent to the Steering Committee for approval.

b. Determine enhancements to the data architecture

Through the process analysis, the architect becomes more familiar with the information environment of the sector and is in a position to search for data architecture deficiencies. For instance, the architect might determine a process-flow to be sound but may notice data inconsistencies because the same data is being entered redundantly at two points.

The intent of this analysis is not to redesign the entire data architecture by making field-level recommendations, but to determine the key high-level adjustments necessary to augment the process architecture. The key dimensions used for evaluating the data architecture are as follows:

Accuracy:	Data must be correct at all times and should reflect changes as quickly as possible.
Completeness:	The data must represent all relevant features of the entity being described.
Consistency:	When a data value is modified all copies of it must be updated as quickly as possible
Precision:	The degree of precision must be tailored to the purpose for which the data is being used.
Timeliness:	Data queries must have a reasonable response time.
Validity of data	As far as possible, there should be only one official data source per data entity.

sources: This will ensure that the data sources can be monitored and their validity sustained.

Security and privacy controls: Sufficient controls must exist to prevent unauthorized leakage of data.

c. Determine enhancements to the process architecture

The architect should analyze the activities associated with the key processes to determine critical 'fault points' that may require process optimization. The criteria used to analyze the processes and determine improvements could fall into one of two categories:

i. Functional requirements
ii. Non-functional requirements.

Functional requirements

These are requirements that are based on the functionality demanded. Based on the target architecture vision outlined in the STAV document and an analysis of the baseline models prepared in Phase III, the architect can identify process weaknesses.

Several methodologies exist for conducting a functional analysis of the existing processes. 'Value stream analysis' is one of the methods in vogue today. As described earlier, any process consists of a sequence of activities, each of which is designed to add value to the service it ultimately delivers. Value also implies incurring costs, some of which could be unnecessary or wasteful.

Identification of redundant or 'low value adding' activities: Value stream analysis of a process involves examining the process-flow model, and enquiring, at each stage whether cost or value are being added. This analysis helps the architect assess the value added by activities in a process, and marking out processes for deletion (redundant processes) or modification.

Non-functional requirement (NFR)

An NFR is a requirement that is not related to functionality but instead reflects factors that contribute to the effective performance of the process. The various NFRs are:

Characteristic	**Metric**	**Design tactic**
Performance	Consists of 2 components: • Throughput: number of instances of a service executed in a time period • Response time: time taken from	Poor performance can be the result of needless distribution of processes, wasteful use of a database, delays caused by queues. Optimization can involve running processes in parallel or

Characteristic	Metric	Design tactic
	request to response	optimizing databases.
Availability	The percentage of time that a process or service is ready for use, excluding planned down time	The primary design technique is to build redundancy into the process. If computerized, automatic failover schemes can be examined. Design the process defensively, i.e. avoid 'Design by contract' but assume that input data can be faulty, and design accordingly.
Recoverability	The ability of a process to be restored to live operations after a failure	One technique is to arrange for backup mechanisms.
Reliability	The mean time between breakdowns in a process	Identify potential vulnerabilities and provide for redundant paths.
Integrity	Data integrity	Reduce data duplication.
Scalability	The ability of a process to grow to accommodate increased work loads	
Security	The ability of a process to prevent unauthorized access to its contents	
Serviceability	The ability of the operations team to monitor and manage a system or process	Maintain a record of performance and other process characteristics so that aberrations can be monitored and corrected.
Usability	The user-friendliness of the process	Processes must be documented clearly and any user interfaces should cater to user requirements.
Portability	The ability of system managers to move a process from one platform to another	

Characteristic	Metric	Design tactic
Integratability	The ability to integrate one process with another	
Interoperability	The ability of processes to interact with each other	

6.2.2 Describe target process and data architecture

The next activity in this phase is to document the target architecture based on the process and data improvement opportunities identified in the previous activity. The sequence of steps is as follows:

a. Identify the affected processes

This step involves listing the processes marked out for change with a summary of the changes required.

b. Modify use cases of the affected processes

For each affected process, it is necessary to modify the use case descriptions. The use case must describe the altered work rules, performance measures, and information exchange of the affected process.

c. Propose the target process and function model

Based on the use case descriptions, the architect modifies the baseline process model (swim-lane diagrams) and creates a target process model. The altered process model could in turn result in changes in the function model (logical hierarchy of related activities). The regrouping of activities will be captured in the swim-lane diagrams. Based on the re-grouping, the architect drafts a target function model that encapsulates the ideal organizational function hierarchy (a function model represents an organizational hierarchy).

d. Propose practical organizational unit hierarchy

Because of certain practical considerations, modifying the function model may not be feasible. In such cases, the ideal function model could be tuned to give way to practical constraints. The resulting function model will represent the new organizational unit hierarchy of the Sector.

e. Assemble target data architecture

Iteratively with the process refinement, the architect will modify the data entity model and if required (and possible) reorganize the data sources (Appendix 14) based on the changes suggested above.

The architect should develop a package that summarizes the process and data architectures for the SAWG to review. A presentation that includes the process and data architectures should be prepared by the architect. This presentation should include a summary of how the business and data architectures align with the high-level business and information requirements derived at the beginning of this step. The architect should conduct a detailed workshop review of the business and data architectures. The SAWG will decide at this point whether to proceed to the next step or further refine the process and data architectures.

6.3 Phase- IV synopsis

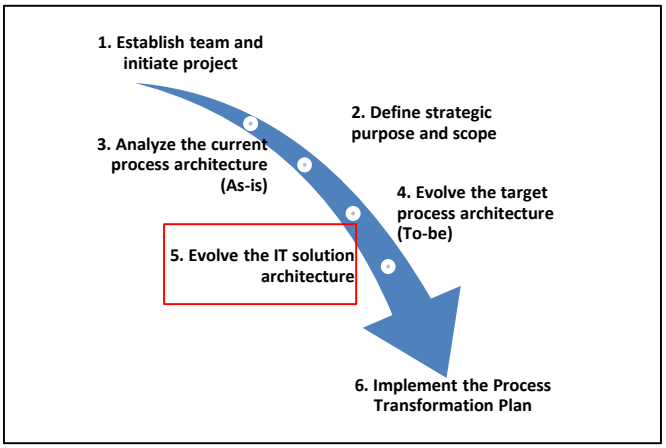
Phase IV identifies target process and data architecture enhancements prospects and recommends an appropriate target process and data architecture. All the documents are submitted to the Executive Sponsor for approval to move on to next phase.

S. No.	Activity	Key inputs	Primary output	Activity owner	Approver
1.	Determine process and data enhancement prospects	• Baseline process model • Baseline service model • Baseline data model	• Process enhancement prospects	SAWG - Process architect SAWG - Data architect	Executive sponsor
2.	Describe the target process and data architecture	• Target process and data architecture	• Target process model • Target use cases • Target service model • Target data model • Target function model	SAWG - Process architect SAWG - Data architect	Executive sponsor

7 Phase V: Evolve the IT solution architecture

7.1 Phase description and purpose

Implementation of the target process architecture evolved in the previous steps would require implementation of new IT systems or modification of existing ones. The activities in this phase help the architect identify the required IT solutions, including the services expected from each system, how the system interfaces with the external world and with other systems, what data it references, and its functionality. The system descriptions are deliberately kept at a black-box level (which is why the term IT solution architecture is used instead of system architecture) so that process architects do not get bogged down prematurely in unnecessary detail at this stage. Also, as far as possible, the solution description should be kept vendor agnostic.



The following sections explain the phase activities in greater detail.

7.2 Activities

The phase contains the following activities:

i. Evaluate the current IT systems

ii. Propose the target solution architecture

iii. Examine transition options

7.2.1 Evaluate the current IT systems

The focus of this activity is to analyze the current IT systems and assess how well those systems support the process and data architectures. The activity includes assessing the systems and services across dimensions such as strategy, data and technology alignment; service management, and maturity. It addresses questions such as:

- How effectively are the IT systems in the sector delivering value compared to the costs associated with operating and maintaining them?
- How do the current systems interact with each other?

The following is the sequence of steps for this activity:

a. Prepare the baseline systems interface diagram

This task leverages the process and data architecture analysis conducted earlier, based on which it identifies the key systems that should be assessed at this stage. The 'Baseline systems interface diagram' is constructed to illustrate how the functionality identified in the process and function models is associated with the existing IT solutions. This diagram shows the IT systems in their current state and identifies the relationships (e.g. data exchange packages) between them.

b. Assess performance of current IT systems

Once the baseline systems interface diagram is prepared, the performance and value of the systems is assessed and potential weaknesses identified. This assessment is a critical task in ensuring that the proposed systems support the strategic mission of the sector, especially the architecture vision outlined in the Sector Target Architecture Vision (STAV) document. The following are some important aspects to be borne in mind while assessing the current systems:

- The information collected should be at a sufficient level of detail to assess the business fit, technology fit, and maturity level of the system and should include its management costs. Cost data is useful in determining projected cost efficiencies that may result from implementing the target architecture.

- Information being gathered should include any known security issues or risks, and stakeholder feedback with regard to overall system performance and alignment with operational needs.

- The assessment should also include an identification of the degree of functional overlap with other systems and the extent to which the systems are associated with re-engineered or streamlined business processes.

- Information can be gathered using a variety of methods, including conducting interviews with key stakeholders.

Appendix 16 is a template for conducting an IT systems survey.

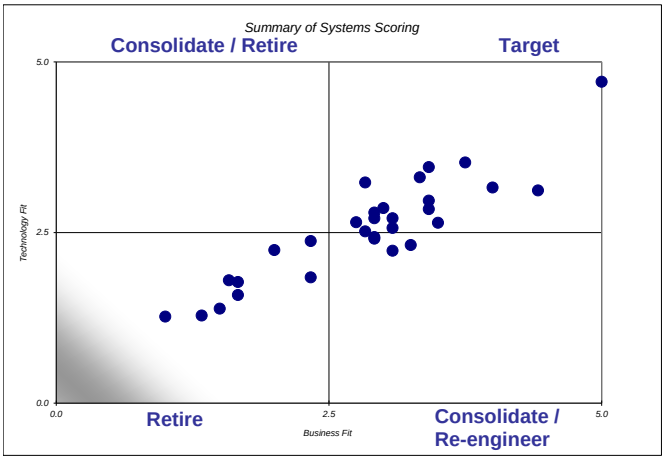
Appendix 17 provides a framework for evaluating system performance once required information is collected. It proposes a scoring methodology, which can help evaluate systems on multiple parameters.

c. Determine adjustments necessary to the current IT solutions

The next step is to use the system evaluation performed in the previous steps to position the systems according to technology fit (if they score high on technological parameters) and business fit (if they score high on net business value addition). Using the scores obtained, slot the IT systems into one or more of the following quadrants:

i. Retire: Systems that have outlived their life or are not performing to their potential.
ii. Consolidate (with other systems): Systems that are useful; but their effectiveness can be enhanced by integrating them with other systems
iii. Reengineer: Systems that are useful, but may need a major technology revamp or re-design
iv. Target: Systems that do not need major changes and are performing optimally

The following diagram



Based on this analysis, the architect recommends changes to the current IT systems or proposes new ones.

7.2.2 Propose the target solution architecture

In this activity, the architect uses the analysis carried out in the previous steps to finalize the systems that will form part of the target architecture state. In general, the IT solutions recommended should be vendor agnostic and capable of being re-used in other sectors. Since sector-specific systems tend to involve higher developmental and operational costs, the specification of such unique systems should be considered only in situations where there are mission critical needs or a lack of available re-usable systems.

The following is the sequence of steps:

a. Identify reuse prospects

Identify systems and services that have the potential to be re-used between departments and sectors. Also, locate systems and services provided by other sectors that can be re-used. This can lead to considerable rationalization across the Government of India, if implemented judiciously.

b. Specify high-level technology and information standards

High-level technology and information standards for the target architecture should be specified with the goal of maintaining alignment with the strategy, process, and information requirements defined in the previous steps.

c. Identify required system components

Based on the improvements recommended in the existing systems, identify the new systems or system components that are required. Selecting target-state systems may include carrying forward an existing system to the target state, consolidation of multiple systems to reduce the total number of systems supporting a function, or identification of a new high-level system requirement associated with automation of business processes.

d. Establish inter-system relationships

The final task in defining the IT solution architecture is to define the relationships between systems and services within the context of the overall boundaries of the sector. The result of this step is the 'Target System Interface Diagram'.

7.2.3 Evolve transition options

This activity includes guidance on evolving options to transition from the current solution architecture to the proposed one. These transition options could include specific system integration projects, formal partnerships (e.g. with vendors), or development of policies. The activity consists of the following sequence of steps:

a. Propose intermediate transition options

Transition options represent paths from the current state to the desired state. They are based on the findings from the study of the current systems, and should be categorized according to the findings. Findings can represent almost any issue, from outdated technologies, through poor business process fit, to redundancies. Specifically, they consist of the strategic transformational opportunities, the business and information opportunities, and the IT solution architecture.

b. Compare transition options

Transition options can be compared on the basis of three criteria – value, cost and risk.

- Value: For each transition option, a value estimate is derived for each strategic focus area. This may require additional input from key stakeholders.

- Cost: Besides development and maintenance costs, this may also include costs of retiring obsolete systems. Cost estimates developed in the earlier steps can be reviewed and used at this stage.

- Risk: Risk analysis is performed for each transition option that includes the identification of the top risks in terms of overall impact. This involves assessing the likelihood of the occurrence of the risk, along with assessing the impact on both the cost and value of the transition option. Risks are then rolled up to obtain an overall likelihood and cost/ value impact.

c. Develop prioritized implementation recommendations

The architect will review the results of the cost/ value/ risk analysis with the SAWG members to select and sequence the transition options. The results should be further reviewed with stakeholders to build support for the recommendations.

The output of this stage is a document that summarizes the baseline and target IT solution architecture and provides an overview of the transition considerations, alternatives, and recommendations. This should include the artifacts that describe the target IT solution architecture and its alignment with the process requirements.

7.3 Phase-V synopsis

Phase V assesses the current IT applications environment within the sector, and assembles the target solution architecture. All documents are submitted to the Executive Sponsor for approval to move on to next phase.

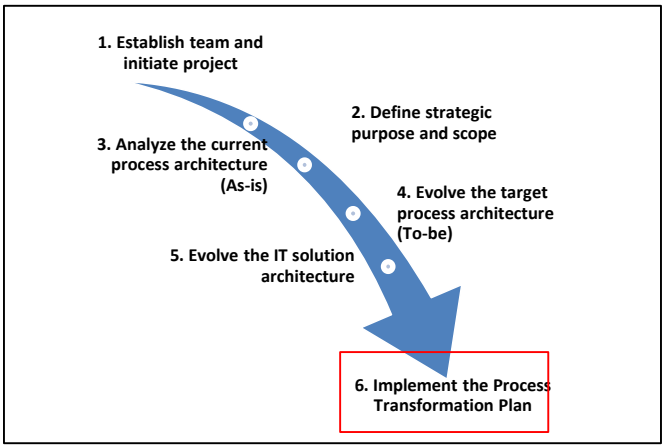
S. No.	Activity	Key inputs	Primary outputs	Activity owner	Approver
1.	Evaluate the current IT systems	• Baseline process model • Target service model • Target process model • Target entity model	• Baseline IT systems survey • Systems interface diagram • Current IT systems performance report	SAWG – IT applications architect	SAWG - PM
2.	Propose the target solution architecture	• Baseline process model • Target service model • Target process model • Target entity model • Current IT systems	• Target IT solution architecture	SAWG – IT application architect	SAWG- PM

		performance report			
3.	Examine transition options	• Target IT solution architecture	• Architecture transition paths		

8 Phase VI: Prepare the transformation plan

8.1 Phase description and purpose

The GPAF concludes with an implementation plan. The plan consolidates the findings, identifies associated transition options, assigns responsibilities, charts out milestones, and prescribes a monitoring framework.



The following sections explain the phase activities in greater detail.

8.2 Activities

This phase includes the following activities:

i. Document and distribute the draft transformation blueprint for review

ii. Collect and analyze feedback

iii. Develop the final transformation blueprint

iv. Brief steering committee and obtain approval

8.2.1 Document and distribute the draft 'Transformation blueprint' for review

The draft Transformation Blueprint is distributed for review to the SAWG, executive heads and executive sponsor. During the review process, a document review form may be used to collect review comments and change requests. The blueprint will take the form of a report containing the following:

- Prescribed recommendations: Changes to process architecture and recommended technology solutions
- Work-breakdown structure (WBS): Breakdown of work items with roles and responsibilities wherever appropriate
- Resource requirements: Staff, infrastructure, and other resources with associated costing
- Implementation schedule: The implementation schedule contains information regarding the timing and dependencies between the items identified in the WBS
- Change management plan: The approach to ensure that implementation follows the path of least possible resistance

8.2.2 Collect and analyze feedback

During the review process, all feedback is recorded, dispensed and consolidated. Follow-up actions are documented and tracked through to completion.

8.2.3 Develop the final transformation blueprint

As feedback actions are documented and closed, comments and changes are also incorporated in the final transformation blueprint document.

8.2.4 Brief steering committee and obtain approval

In this activity, a formal presentation of the blueprint is made to the Steering Committee, after which the decision to approve the blueprint is recorded. Any issues that arise during the final review are addressed and closed as needed.

8.3 Phase-VI synopsis

Phase VI concludes the process architecting for the sector. It results in the creation of a transformation blueprint. The transformation blueprint consolidates all the recommendations related to strategy, functions, processes, services, data, and IT solutions made in the previous phases.

S. No.	Activity	Key inputs	Primary outputs	Activity owner	Approver
1.	Document and distribute the Draft Transformation Blueprint for review	• SAMS • STAV • Target architecture model	• Draft transformation blueprint	SAWG – PM	

		• Target IT solution architecture			
2.	Collect and analyze feedback	• Draft transformation blueprint	•	SAWG – PM	
3.	Publish the final Transformation Blueprint	• Draft transformation blueprint	• Final transformation blueprint	SAWG – PM	SASC

9 Appendix 1: Sector Architecture Mission Statement

The Sector Architecture Mission Statement (SAMS) summarizes the foundational purpose behind the architecture development and traces its linkage with the overall service mission of the sector.

Sector:	<Name of sector>	
Organizational units:	Ministry	
	Departments	i. ii. iii.
	Autonomous organizations	i. ii. iii.
	PSUs	i. ii. iii.
Sector mission		
Main services delivered	i. ii. iii.	
Architecture Mission statement		

10 Appendix 2: Sector Architecture Working Group Team Roster

The team roster contains organizational and contact information regarding the members of the Sector Architecture Unit (SAWG), a standing committee assigned the mandate to manage the architecture development.

S. No.	Name	Title	Organization	Email	Office Phone	Cell Phone

11 Appendix 3: Sector Architecture Project Charter

The project charter is the official authorization for the project team to undertake the activities prescribed in the GPAF.

Project purpose

[Describe the purpose of the project]

Organizational context

[Describe the Executive Sponsor, the participants, and the external interfaces (organizations)]

Alignment with mission

[Describe how the project aligns with the mission of the sector]

Project assumptions

[Describe any assumptions of the project]

Project constraints

[Describe any constraints on the project (e.g. Cost, schedule)]

Project scope

[Describe the activities that the core project team will undertake and their expected effect on the organization.]

Out of Scope

[Describe those objectives that may be outside the scope of the project]

Project authorization

[Provide statement or reference to statement by the authorizing authority]

Core Project Team Members:

[List the SAWG members of the project]

External stakeholders

[List the external stakeholder of the project]

Other project resources

[Describe other resources required by the project team]

12 Appendix 4: Sector Abstract

This artifact describes the main activities of the sector in brief. It serves like a set of notes that the analyst uses to get an insight into the sector.

Sector

[Name the sector]

Sector mission

[Articulate the main purpose for the existence of the units within the sector]

Services overview

List the services currently offered by the sector

Plans

[Describe any plans and strategies for the sector]

Organization structure

[List the ministries, departments, autonomous organizations, and other organization units comprising the sector.]

[For each organization unit, describe the following:

i. Organization unit name

ii. Functional divisions and sub-divisions

iii. Services delivered

iv. IT systems in use]

Key stakeholders

[Describe the main stakeholders in the activities of the sector.]

Actor catalogue

[Create a list of key personnel in the sector along with their roles.]

Organizational unit	Role	Name
e.g. Division 1	e.g. Manage grievance handling	

13 Appendix 5: Stakeholder catalogue

This artifact identifies the groups with a significant stake in the success of the architecture project. Stakeholders can be categorized as:

- *Citizens*
- *Suppliers*
- *General staff*
- *Decision-makers*
- *Policy makers*
- *Auditors*

Some simplified examples are given below.

S. No.	Stakeholder profile	Stakeholder category	Level of involvement (High/ Medium/ Low)	Need description	Management strategy
	[Profile the stakeholder]	[Category – e.g. citizen, employee, vendor]	[Degree of stake]	[Description of the need]	[Determine the nature and frequency of interaction with these stakeholders (regular, at the end, at the start) Is approval required from them (if yes, which artifacts)? Evolve the communication strategy (awareness, training)]
E.g.	*Citizens who need passports*	*Citizen*	*High*	*Speedy service* *Traceability*	*Set up a portal or social media group* *Awareness sessions*
E.g.	*Road contractors*	*Supplier*	*High*	*Transparency*	*Have focused group discussions*
E.g.	*Employees*	*General staff*	*Medium*	*Attendance and leave system is optimized*	*Awareness sessions*
E.g.	*Senior leadership*	*Decision-makers*	*High*	*Information availability*	*Seek prior approval.*
E.g.	*Minister*	*Policy maker*	*Medium*	*Project tracking*	*Keep informed*

14 Appendix 6: SWOT report

This is a technique for identifying the capabilities of an organization, throwing up alerts (if any), and highlighting opportunities for development in the future.

Strengths	**Weaknesses**
Identify all strengths that exist currently (and are known prior to the architecting process). *E.g. The department has excellent relationships with suppliers.*	Identify all weaknesses that exist currently (and are known prior to the architecting process). *E.g. Data is scattered amongst multiple sources, and often duplicated.*
Opportunities	**Threats**
Identify existing gaps and future opportunities that are potential strengths. *E.g. There is a strong demand to provide status reports (on the implementation of various services).*	Also, identify any threats that exist, as they are potential future weaknesses. *E.g. Technology is changing so rapidly that systems developed a few years ago are becoming obsolete.*

15 Appendix 7: Strategic transformation options

This artifact assesses the impact of the capability analysis (SWOT) on process and technology and arrives at actionable strategic options.

Impact analysis

[Assess the impact of the various strengths, weaknesses, opportunities, and threats]

	Enterprise architecture impact	**Service impact**	**Process impact**	**Technology impact**	**Strategic option**
Strength					
	[Does the strength impact enterprise architecture? If not, can it have a potential future impact?]	[Does the strength impact the services delivered? If not, can it have a potential future impact?]	[Does the strength impact organizational processes? If not, can it have a potential future impact?]	[Does the strength impact IT system performance? If not, can it have a potential future impact?]	[Describe how the strength be exploited further to streamline services, processes, and technological systems.]
i.					
ii.					
Weakness					
	[Does the weakness impact enterprise architecture? If not, can it have a potential future impact?]	[Does the weakness impact the services delivered? If not, can it have a potential future impact?]	[Does the weakness impact organizational processes? If not, can it have a potential future impact?]	[Does the weakness impact IT system performance? If not, can it have a potential future impact?]	[How can the impact of the weakness on services, processes, and technological systems be reduced?]
i.					
ii.					
Opportunity					
	[Can the opportunity have a potential impact on enterprise architecture?]	[Can the opportunity impact the services delivered?	[Can the opportunity impact organizational processes?]	[Can the opportunity impact IT system performance?]	How can the opportunity be exploited to streamline services, processes, and technological systems.

i.					
ii.					
Threat					
	[Can the threat have a potential impact on enterprise architecture?]	[Can the threat impact the services delivered?	[Can the threat impact organizational processes?]	[Can the threat impact IT system performance?]	How can the threat be countered to streamline services, processes, and technological systems.
i.					
ii.					

Prioritization of strategic options

[Consolidate and prioritize the strategic options identified above into a list of actionable recommendations.]

Strategic option	**Option description**	**Assumptions**	**Selection Criteria**						
			Investment Reality	Driver Urgency	Technical Risk	Work Force	Time to Implement	Citizen Benefit	Mission Impact

Actionable recommendations

[From the above table, extract strategic options that are potential transformational prospects and actionable at some point in the future.]

Option	**Option description**	**Selection Criteria**							**Totals**
		Investment Reality	**Driver Urgency**	**Technical Risk**	**Work Force**	**Time to Implement**	**Citizen Benefit**	**Mission Impact**	

Option	Option description	Selection Criteria							Totals
		Investment Reality	Driver Urgency	Technical Risk	Work Force	Time to Implement	Citizen Benefit	Mission Impact	

16 Appendix 8: Risk catalogue

A summary of the risks facing the architecture project

ID	Risk Label	Risk Description	Risk Category	Severity	Probability	Risk Priority	Submitted by	Date Identified	Risk Owner	Mitigation Plan
Unique ID tracking number for each Risk identified	Brief label for the risk	Provide a more detailed description of the risk including the expected impact if the risk occurs	Enter a category description (i.e., type) of the risk. Examples include mission, people, process, cost, data, privacy, security, and technology.)	What is the severity of the risk to the project scope, schedule, and resources if it occurs (H/M/L)	What is the likelihood that the risk may occur (H/M/L)	Enter the overall priority of the risk (H/M/L)	Enter the name of the person who identified the risk	Date the risk was identified	Name of owner of the risk. risk owner is responsible for tracking and reporting on the status of the risk and any associated response plans	What is the overall plan to reduce the probability or effect of the risk?
1										
2										
3										

17 Appendix 9: Sector Target Architecture Vision

This artifact draws on the architecture mission, sector capability analysis, and architecture strategy to prepare a vision statement that outlines what the key stakeholders should expect from the architecting exercise.

No detailed format has been prescribed, but a simplified vision statement has been given below (only for illustrating the concept). This vision statement is for a single division within a department. In actual practice, a vision statement for an entire sector could be more complex.

Mission	Vision	
To facilitate speedy redress of citizen complaints	Single-window for citizens	Citizens know where to post their complaints and do not need to know the internal structure of the government
	Filter spam	Departments do not get distracted from handling genuine complaints
	Provide prioritization assistance	Complaints receive attention that is commensurate to the seriousness of the complaint
	De-duplicate	Complaints sent multiple times (or through multiple channels) are linked together and treated as a single mail
	Provide precedents	Departments can get access to valuable inputs from similar cases received in the past in other departments
	Tracking assistance to citizens	Citizens are given regular or on-demand reports on the status of the complaint
	Follow up with concerned departments	Departments are reminded about the status of the complaint and asked to follow-up

18 Appendix 10: Function model

This artifact describes the functions within the organizations in the sector. A function is a group of activities related by some common factor (usually expertise). The model will undergo changes during the course of the architecture exercise beginning with the baseline version (current functions) and concluding with the target version.

Repeat this exercise for all functional areas, divisions, sections. The level of granularity to which activities should be decomposed can vary. The OPOPOT (One-person-one-place-one-time) criterion has been found to be useful in determining granularity level.

ID	Organization/ Activity type	Brief description	Main services/ functions	Head	Parent organization/ activity
	Sector M1				
	Department D1				
	Functional area F1				
	Division V1				
	Section S1				
	Activity A1				
	Activity A2				
	Activity A3				

19 Appendix 11: Services catalogue

The service model is a description of the services provided by the organizations within the sector. These services could be both external and internal. The model focuses on the interface details of a service and less on its internals.

The services catalogue consists of two parts: a consolidated listing and a service description (per service).

Service listing

Service ID	Service name	Internal/ External	Output	SLA	Interface description
S1					
S2					
S3					
S4					
S5					
S6					

Service description

Each service listed above is described in detail.

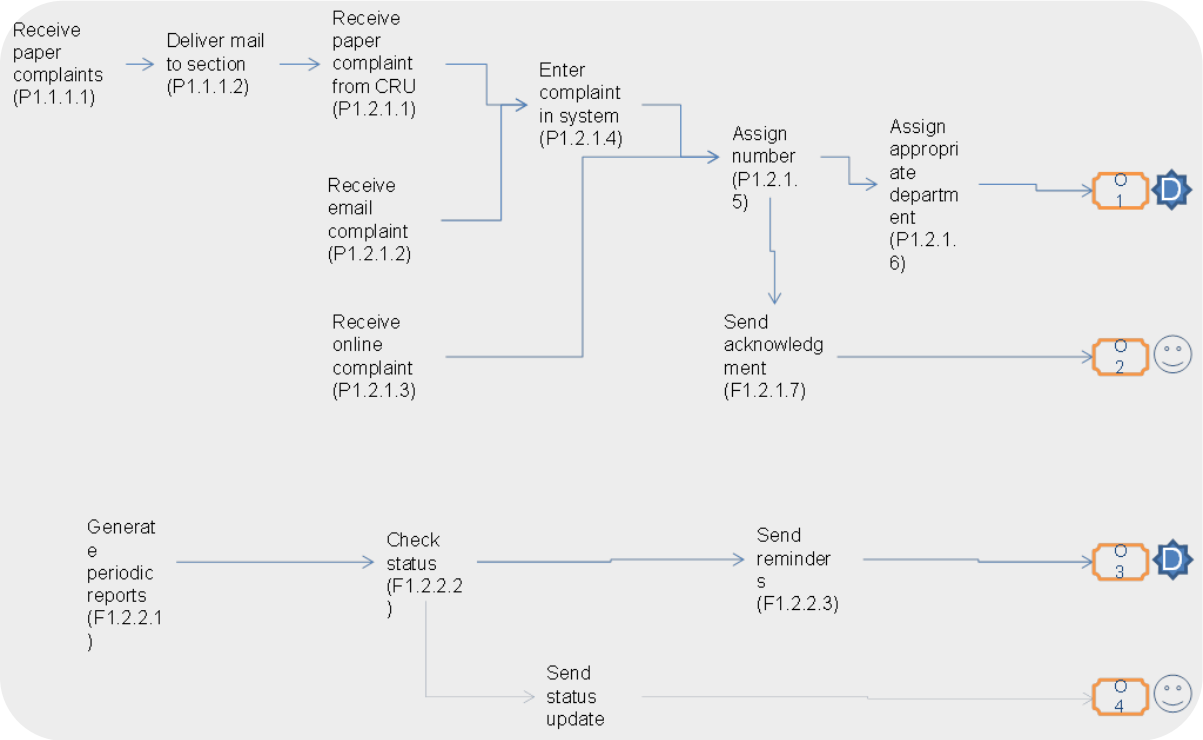
Service type	
Service ID	
Service name	
Component activities	
Brief description	
Interface description	
Trigger	
Reference information	
Output information	

SLA	
Pre-conditions	
Post conditions	
Duration target	
Frequency	
Commercials	
Locations	
Service provider	
Service consumers	
Data references	

20 Appendix 12: Process model

A process is a grouping of activities that act in sequence to produce a particular output. Thus, a process model defers from a function model in the sequencing of activities. It also defers from the service model in that it goes under the hood to examine the internals of an activity.

The diagram below illustrates a simple process model.



21 Appendix 13: Use case catalogue

A use case is a detailed description of an activity. It is used by the function and process models and can itself refined during the course of the architecting process – starting with a baseline version and ending with a target use case.

A use case catalogue is the set of all use cases in the organization (sector).

Use case ID	
Activity ID	Unique identifier
Activity type	
Activity name	A short active verb phrase, indicating the goal
Component	The business or application component that uses this activity to deliver a service
Brief description	Where the name is insufficient, add a sentence stating the purpose.
Primary actor	Role name or description of the primary actor
Trigger	What causes the process to start – event, message or time event
Input	Data carried as arguments in the input message, with types
Output	Data output or returned at the end of the process, with types
Pre-conditions	The state the world must be in for the process to work
Post conditions	The state of the world after the process finishes. Main Success End Condition: the state upon successful completion. Alternative End Conditions: the state if goal abandoned, may imply handling side effects
Logic (see diagram)	

Main success path	See swim-lane diagram
Alternative paths	See swim-lane diagram
Non-functional characteristics	
Duration target	The amount of time this process should take, average and maximum
Frequency	How often the process is expected to occur, peak times and loads
Cross-references to other artifacts	
Locations	Locations where process is invoked or executed
Used processes	Processes used, and whether the use is a dependency or not
Consumer processes	Processes that use this one
I/O components	UI definitions
Data references	Persistent entities accessed
Secondary actors	Other actors, systems or components the process needs
Requirements	Requirements supported

22 Appendix 14: Information entity model

This artifact describes the key data entities that are used by the various processes and services. The model can have various versions beginning with a baseline version and ending with the target model as the architecting proceeds and enhancement prospects are identified.

Entity ID	Entity name	Brief description	Source	Key data elements

23 Appendix 15: Service - data matrix

This artifact establishes the relationship between information entities and the services that reference them.

A service could act on an entity in one of the following ways:

i. *Create (an instance of the entity)*
ii. *Refer (to the entity)*
iii. *Update (an instance of the entity)*
iv. *Delete (Delete an instance of the entity)*

[Use the services and entity catalogues to create this matrix of service versus entity.]

	Entity ID	**E1**	**E2**	**E3**	**E4**	**E5**	**E6**	**E7**	**E8**
	Entity name								
ID	**Service name**								
S1		R	R	C	R		R		
S2				U	R		R		
S3				U	R	C	R		
S4				R	R		R		
S5				R	R		R	C	
S6				R	R		R	R	C

Legend

C: Create, R: Read, U: Update, D: Delete

24 Appendix 16: Baseline IT systems survey

This artifact surveys the current IT systems and assesses their relevance in the context of the current and target architecture models.

System ID	System name	Brief description of functionality	Technology	Services provided	Procurement/ development history	Cost

25 Appendix 17: Baseline system performance report

This artifact assesses the performance of the IT systems currently in use within the sector. Sample criteria are given in the table below. The various IT systems can be rated based on these criteria.

Criteria	Score description	Low (1)	Medium (3)	High (5)
P1	System capability for supporting associated strategic goals and objectives			
P2	Extent of stakeholders' feedback for performance measurement and system refinement.			
P3	Demonstrate a projected return on investment that is clearly equal to or better than alternative uses of available resources (i.e. enterprise products or services).			
B1	Lack of functional overlap with other systems.			
B2	System incorporates re-engineered/streamlined business processes (workflow) in an automated fashion that supporting strategic goals and objectives			
D1	Existence and documentation of data standards and quality control procedures.			
D2	Relative maturity of system's data storage and access methods.			
D3	Relative redundancy of system data			
A1	Degree of enterprise architectural compliance			
A2	Extent to which system design requirements are defined and documented.			
A3	Extent to which system interfaces are defined and documented.			
A4	Extent to which high-level design or operational concepts are defined.			
A5	No alternative private sector or governmental source can efficiently support the function.			
T1	Extent of compliance with standards, protocols and best practices.			
T2	Extent of maximum use of shared, existing infrastructure components and services.			
S1	Extent to which the system complies with current security requirements and extent of progress through the C&A process			
SM1	System deployments are modular and are/have been performed in phases based on mission needs			
SM2	Existing Acquisition and Funding Strategy is appropriate to support mission needs as an enterprise service			

SM3	Existing Project/Systems have been identified as candidates for target Service needs			

26 Appendix 18: Target IT solution architecture

Based on the baseline IT system performance report, a list of proposed IT solutions can be developed.

System ID	System name	Brief description of functionality	Enhancement/ new	Technology	Services provided	Development/ COTS	Cost

27 Appendix 19: Process maturity model

Process maturity reflects how close an organization is to being capable of innovating and improving continuously. Achieving process maturity is one of the goals of a process architecture. There are various internationally accepted models for assessing process maturity. This appendix advocates the use of the **Business Process Maturity Model (BPMM),** developed by the Object Management Group (OMG), a not for profit international industry consortium.

The model describes an evolutionary improvement path that guides organisations in moving from immature, inconsistent processes to mature, disciplined processes. In following the BPMM improvement path, organisational behaviour and culture will change allowing the organisation to produce continually improving business results.

The five levels of maturity guide an organisation to evolving from poorly defined and inconsistent practices, to repeatable practices at the unit level, to standard organisation-wide end-to-end business processes, to statistically managed and predictable processes and finally to continuous process innovation and optimisation.

The five maturity levels can be briefly described in terms of their management focus and primary objective:

Initial - "Fire-fighting management" - There are no specific objectives. Success in these organisations depends on the competence and heroics of the people in the organisation and not on the use of proven processes.

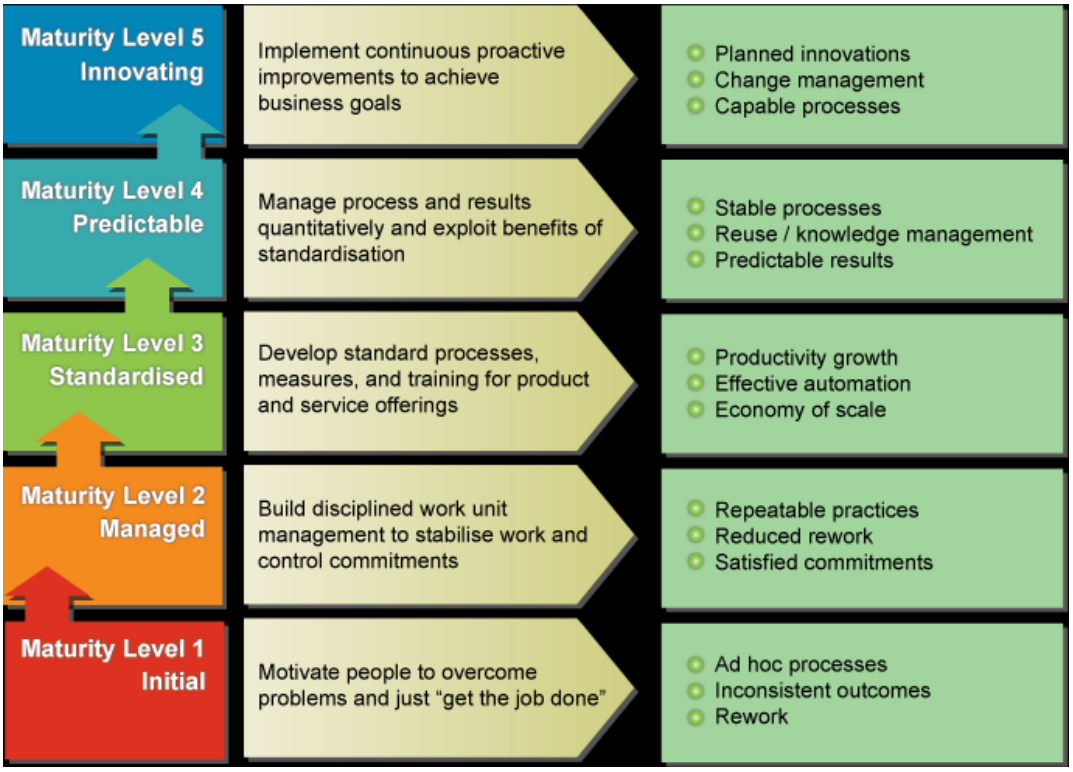
Managed - "Work unit management" - The objective is to create a management foundation within each work unit or project. 39

Standardised - "Process management" - The objective is to establish and use a common organisational process infrastructure and associated process assets to achieve consistency in how work is performed to provide the organisation's products and services.

Predictable - "Capability management" - The objective is to manage and exploit the capability of the organisational process infrastructure and associated process assets to achieve predictable results with controlled variation.

Innovating - "Change management" - The objective is to continuously improve the organisation's processes and the resulting products and services through defect and problem prevention, continuous capability, and planned innovative improvements.

The table below summarizes this maturity model.


Maturity Level 5
Innovating
Implement continuous proactive improvements to achieve business goals
Planned innovations
Change management
Capable processes
Maturity Level 4
Predictable
Manage process and results quantitatively and exploit benefits of standardisation
Stable processes
Reuse / knowledge management
Predictable results
Maturity Level 3
Standardised
Develop standard processes, measures, and training for product and service offerings
Productivity growth
Effective automation
Economy of scale
Maturity Level 2
Managed
Build disciplined work unit management to stabilise work and control commitments
Repeatable practices
Reduced rework
Satisfied commitments
Maturity Level 1
Initial
Motivate people to overcome problems and just "get the job done"
Ad hoc processes
Inconsistent outcomes
Rework

28 Appendix 20: Architecture capability maturity model

Architecture capability maturity reflects how close an organization is to a state where its process architecture evolves dynamically through an established internal process. A number of international models exist, which can be customized to fit into government process architecture. This appendix presents the following alternative models:

i. Government Process Architecture Capability Maturity (GPACM): Model A

ii. Government Process Architecture Capability Maturity (GPACM): Model B

28.1 Government Process Architecture Capability Maturity (GPACM): Model A

We may conceptualize a four level process capability starting from a Basic Foundational Process Automation to a Standardized System/ Solution Architecture, Enhanced functional architecture and at the highest level depicting process capability, the Intelligent System Architecture. These four levels of process capability and maturity are detailed below.

Level 1: Basic Foundational Process Automation (GFPA)

- Brainstorming and documentation of business objectives and mandates
- Study and documentation of operations/ functions and listing of processes
- Specifying details of organization of work and earmarking teams/resources
- Specification & detailing the roles and responsibility matrix
- Detailing the process flow for each of the processes (in the form of process flow diagrams)
- Specifying business rules for compliance

Level 2: Standardized System/Solution Architecture (SSA)

- Implementing alternate flows/ contingent process pathways following event triggers, exceptions, alerts
- Access control based on user profile and on the basis of need to know/operate
- Validation while filling data entry, transactions
- Execution, instructions and talk back features
- Modularity

- Scalability
- Configuration management - re configuring roles, rules
- Control of software behavior
- Reporting
- Audit trails
- Backup & restore operations
- Encrypted access & security features
- System outrages & fall back options to transact manually & thereafter restoration of online operations

Level 3: Enhanced Functional Architecture (EFA)

- Maturity of form based transactions
- Engaging gui with features such as context help, navigation aids, tool tips, progressive drilldown features,
- Cross references, alerts and exceptions
- Save & resume operations
- Fault diagnosis
- Role centered dashboards
- Activity logging, use of metrics & performance tracking
- Dynamic interfacing of forms
- Disaster recovery, snapshots, roll back features
- Interoperability and interface design
- Data migration

Level 4: Intelligent System Architecture (ISA)

- Self healing architecture – autonomous response for fault detection, recovery
- Use of auto responders

- Defining default mode of operations and other types of system operative modes and corresponding system behavior

28.2 Government Process Architecture Capability Maturity (GPACM): Model B

This is an alternative model that is customized from internationally used models and can be used to assess the process architecture capability maturity of a government organization. It assesses maturity along five levels depending on whether a standard defined re-usable framework exists, which tracks and analyzes performance metrics. These levels are briefly described below:

GPA0 - Initial

No documented process architectural framework exists at this level of maturity. While solutions are developed and implemented, this is done with no recognized standards or base practices. The organization is completely reliant on the knowledge of individual contributors.

GPA1 - Informal

The base process architecture framework and standards have been defined but they are rarely used and verified. Organizations with an architecture framework at this level are still dependent on the knowledge of individual contributors.

GPA2 - Re-usable

The base architecture and standards have been identified and are being tracked and verified. At this point in the program processes are repeatable and reusable templates are starting to emerge.

GPA3 - Standard

The architecture framework is well defined; using approved standards and customized versions of the templates. Processes are documented across the organization and are being tracked. Performance metrics are collected, analyzed and acted upon. The metrics are used to predict performance and provide better understanding of the processes and capabilities.

GPA5 - Dynamic

The processes are mature; targets have been set for effectiveness and efficiency based on business and technical goals. There are ongoing refinements and improvements based on the understanding of the impact changes have to these processes.

29 Appendix 21: Competency assessment framework

The GPAF recommends that, as far as possible, the Sector Architecture Working Group (SAWG) be staffed with government officers. To effectively contribute to the working group, government employees need to have specific competencies. These competencies are:

- Generic skills - leadership, teamwork, inter-personal skills
- Functional skills - business cases, business process, strategic planning
- Enterprise architecture skills - modeling, building block design, applications and role design, systems integration
- Program or project management skills - managing change, project management methods and tools
- General IT knowledge - top-level knowledge of applications, asset management, migration planning, and service level agreements (SLAs)
- Technical IT skills - software engineering, security, data interchange, data management
- Legal environment - data protection laws, contract law, procurement law, and fraud

Assessing whether an officer of the Government of India possess one or more of these skills requires a suitably tailored competency assessment framework. Such a framework will contain tests that display characteristics of, validity, reproducibility, and feasibility.

Validity

A test is valid if it measures what we really wish to measure. For example, the ability to comprehend and understand the operations and functions being carried out in a given department or organisational unit is not a valid test of the subject's ability to produce documentation capturing the functional requirements of processes. This type of validity is called content validity.

There is also a concept of predictive validity. For example, does an evaluation or assessment designed for testing knowledge of operations/ functions carried out in an organizational unit predict the subject's competence in undertaking a process analysis to enable him reengineer them optimally?

Reproducibility

A reliable test should produce reproducible results. The results should be similar at all times.

Feasibility

Feasibility refers to the time involved in developing, administering, scoring, interpreting and reporting a test, which should be justifiable.

The most commonly adopted approach is to have multiple exercises or simulations designed to replicate the tasks and demands of the job for which a candidate is being considered. These exercises or simulations are designed in such a way that candidates can undertake them singly or in groups, and under the watchful eyes of assessors.

Most often, progressive development and assessment of competencies can be integrated with a structured training programme. A valid, reliable, and feasible assessment process will need to take into consideration the following:

- The overall purpose of the assessment system must be documented and made known to the trainees being assessed.
- The purpose of every component of the assessment system must be specified and available to the trainees, educators, and employers.
- The sequence of assessments must match the progression through the competency development pathway.
- Assessments would need to build on previous assessments.
- Assessments will need to systematically sample the entire content, appropriate to the stage of training, with reference to the common and important aspects and problems characterizing the domain.
- Methods will be chosen on the basis of validity, reliability, feasibility, cost effectiveness, opportunities for feedback, and impact on learning.
- The rationale for the choice of each assessment method will be documented and evidence-based.
- The methods used to set standards for classification of trainee's performance/ competence will require to be transparent.
- Assessments must provide relevant feedback.

Each sector can adopt its own competency assessment framework. Here are the general steps:

- Identify a suitable competency model and finalize it in consultation with the ministry/ department, for the targeted group of employees.
- Measure and map the competencies of each employee in the target group.

- Analyze competency gaps of individual employees in the target group.
- Recommend areas of improvement.